Recurrent Acute Gastric Volvulus

A New Method of Treatment

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DIAGNOSIS of the "acute abdomen" is usually a problem for surgeons. In differentiation the common conditions must be considered first but unusual conditions must be kept in mind too. Acute volvulus of the stomach is a rare condition. Most surgeons go through a complete residency and a lifetime of experience without seeing a case. Jenkinson and Bate[7] in January, 1953, found reports of 100 cases in a review of the American and British literature. However, many of these cases should not have been included, for among them were cases in which there was a high transverse position without definite torsion of the organ, and also cases of simple rotation without volvulus. High positions of the stomach with rotation of the entire viscus even with the greater curvature at a higher level than the lesser curvature are not uncommon, particularly in hypersthenic patients. These conditions should not be confused with true volvulus. In fact, the incidence of volvulus is less in such patients than in leptosomatic persons.

ETIOLOGY

Since Berti[2] first reported on volvulus of the stomach in 1866, many factors have been cited as a cause, among which may be listed the following:

A. GASTRIC

1. Elongation, relaxation or absence of the suspensory ligaments, namely the gastrocolic and/or gastrohepatic omenta and the transverse mesocolon.
2. Tumors of or near the stomach.
3. Gastric distention from overeating or aerophagia.
4. Inflammatory processes of or near the stomach.
5. Persistent vomiting.

B. PERIGASTRIC

1. Abnormal length of the transverse colon and/or mesocolon. "Aerocoly" or gaseous distention of the colon.
2. Eventration of the diaphragm and esophageal hernia.

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3. Phrenic interruption (postsurgical).
4. Displacement by neighboring organs such as abnormal left lobe of the liver, gravid uterus, etc.
5. Prolonged use of girdles or other excessive pressure over the abdomen.

While it is impossible to prove a definite etiological relationship between the above factors and volvulus of the stomach, when the latter condition is accompanied by other intraabdominal pathologic change, it seems likely that the twisting of the stomach has occurred as a complication of the other abnormality. In particular, the role of the colon has been emphasized. As the stomach twists, it drags the transverse colon with it, by reason of its attachment to the gastrocolic ligament. Conversely, colonic distention can cause torsion because of this same ligament, which, unless attenuated or absent, may force both organs to move in unison. There are a few reports in which the term *idiopathic* is appended because of the absence of any abnormal findings at operation. However, it is doubtful if volvulus can occur without at least attenuation of the gastric attachments.

CLASSIFICATION OF VOLVULUS

I. ANATOMIC TYPE (AXIS OF ROTATION)

A. Volvulus Mesenterio-Axialis

The stomach is twisted around the line which connects the middle of the lesser with the middle of the greater curvature, thus producing a torsion of the stomach rather than a true volvulus. Characteristically, with rotation of the stomach about the long axis of the gastrohepatic omentum the pyloric antrum twists from right to left.

B. Volvulus Organo-Axialis

The organ is rotated around the line which connects the cardia with the pylorus. The stomach is twisted upward along the long axis of the organ. This anatomic configuration represents true volvulus. It may appear in any of the following varieties:

1. *Supracolic.* The stomach remains cephalad to the transverse colon even when twisted.
2. *Infracolic.* The rotation of the greater curvature pulls the transverse colon upward until the latter lies above the level of the stomach, having rotated at least 180°. This arrangement is very rare;

it may occur with a normal or short gastrocolic omentum.

3. *Anterior.* The greater curvature rolls along the anterior abdominal wall upward on the anterior surface of the stomach. The stomach is then veiled by the gastrocolic ligament.

4. *Posterior.* The greater curvature twists cephalad along the posterior abdominal wall.

II. EXTENT

A. Total. Torsion is 180° or more.

B. Partial. Less than 180°.

III. SEVERITY

A. Acute.

B. Chronic. Recurrent milder symptoms or symptomless.

DIAGNOSIS

Gastric volvulus may be symptomless or may cause an "acute abdomen," depending upon the degree of rotation. Beyond 180°, signs of complete obstruction and strangulation appear; death may occur unless the volvulus is reduced surgically. In considering this condition, Borchardt and Lenormant's triad should be remembered: (1) Vigorous unproductive retching, (2) epigastric pain, and (3) the physician's inability to pass a gastric tube. X-ray studies show the stomach in a high position, with a cascade appearance of the cardia, an hourglass configuration of the pars media, and visualization of the greater curvature above the lesser.[1,6,9] Gastric volvulus must be differentiated from all those conditions which can cause acute epigastric pain—*i.e.*, pancreatitis, mesenteric embolus, cholecystitis, perforated ulcer and others. However, the diagnosis can be made readily if one remembers the significance of the patient's unsuccessful attempts at vomiting coupled with the inability to pass a decompressive tube. Bockus[3] emphasizes the absence of bile when vomiting does occur, presumably due to pyloric obstruction.

TREATMENT

Medical treatment consisting of rest, bowel decompression (where possible), antispasmodics and parenteral alimentation, is often successful. Most patients will have recurrences, however, and operation is indicated even in the absence of other intra-abdominal disease.

The surgical treatment requires primarily reduction of the volvulus and correction of any associated disease. In the absence of other organic disease, surgical correction should be aimed at prevention of recurrence. Gastrogastrostomy, gastroenterostomy, gastric resection, and anterior gastropexy have all been suggested as means of immobilizing the stomach. In correspondence with several national authorities and clinics[4,8,14] there were no reports of any personal experience with surgical treatment of this condition. On a theoretical basis, Ravdin[11] and Marshall[10] both suggested gastric resection if remedial measures were indicated.

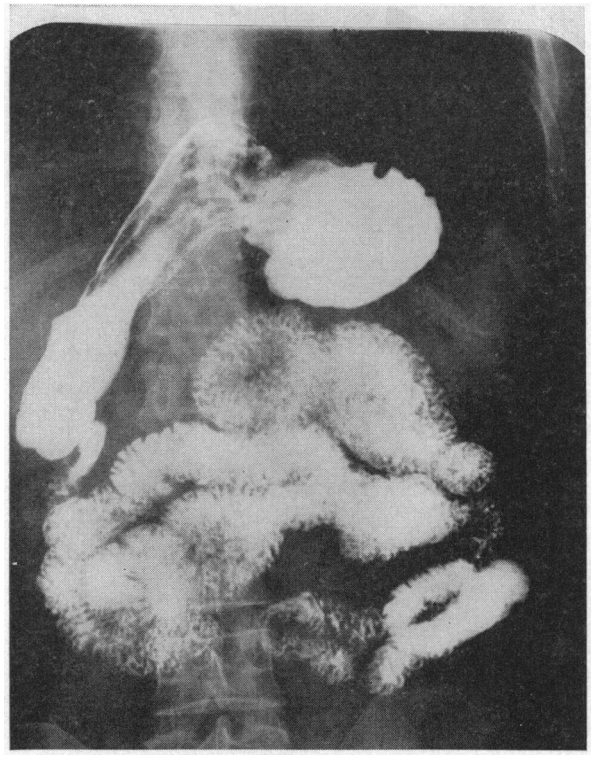

Figure 1.*—Preoperative x-ray film. Note the greater curvature located above the lesser curvature.

The ensuing case report describes a relatively uncomplicated surgical technique utilized in the successful correction of a recurrent gastric volvulus.

REPORT OF A CASE

A 37-year-old Caucasian woman was admitted to Cedars of Lebanon Hospital in August, 1955, with the following history.

In 1953 the patient underwent appendectomy for "acute surgical abdomen." The pathologist reported the appendix normal. The operating surgeon was unable to find any pathologic condition in the abdomen by exploration through the McBurney incision. However, he did note extreme friability of the mesentery of the small bowel and inflammation of the serosa of both small and large bowel.

In October, 1954, following a full meal, the patient had severe epigastric cramping pains which caused her to writhe. Vomiting of the recently ingested food followed, apparently not bile stained. Within three hours chills developed. In a report of physical examination done at the time, rebound tenderness was noted. The patient became semistuporous and was admitted to the hospital.

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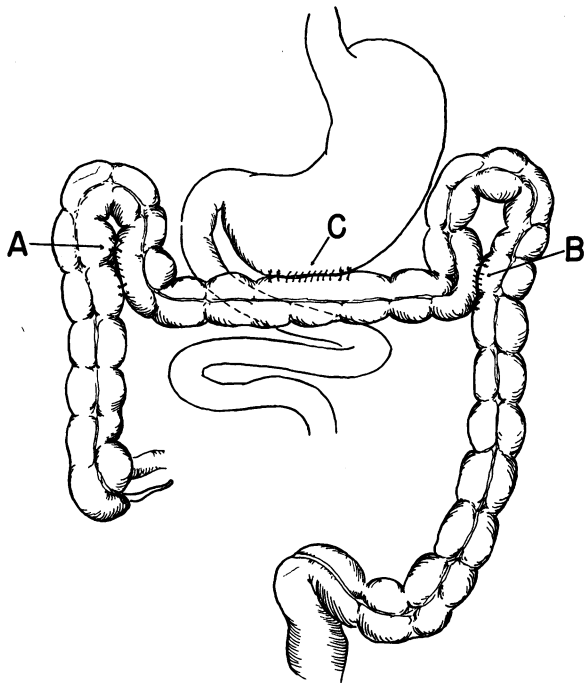

Figure 2.—A, B, C = seromuscular approximating sutures.

At the time of admittance, leukocytes numbered 14,500 per cu. mm. with a pronounced shift to the left in cell differential. The erythrocyte content and the blood amylase were within normal limits. Upon urinalysis a 2 plus reaction for albumin and a trace of acetone were noted. The sedimentation rate was 23 mm. in one hour (corrected). When all the symptoms except mild epigastric tenderness subsided, the patient was permitted to leave the hospital in 48 hours. In x-ray studies after discharge from the hospital the gallbladder and colon appeared normal. However, in upper gastrointestinal tract films a reversible gastric volvulus was observed. Whenever the patient was shifted from the postero-anterior to a full lateral position, a complete torsion of the curvatures of the stomach occurred (Figure 1). This phenomenon was repeatedly elicited on later examinations, but was always readily reducible with change in the patient's position.

As the patient had had two former severe attacks requiring hospitalization, and since positional changes produced epigastric discomfort and a "pulling feeling at the throat," surgical correction was agreed upon. Gastrogastrostomy was not applicable to this type of volvulus although it has been used in cases of twisting of the stomach about its mesenteric axis. Gastroenterostomy seemed to have the disadvantage of disposing toward a possible stomal ulcer later. Gastric resection appeared too formidable a procedure to perform in a woman 37 years of age with no demonstrable intragastric disease. Conversely, gastropexy by means of fixing the omentum or the gastric wall to the parietal peritoneum seemed

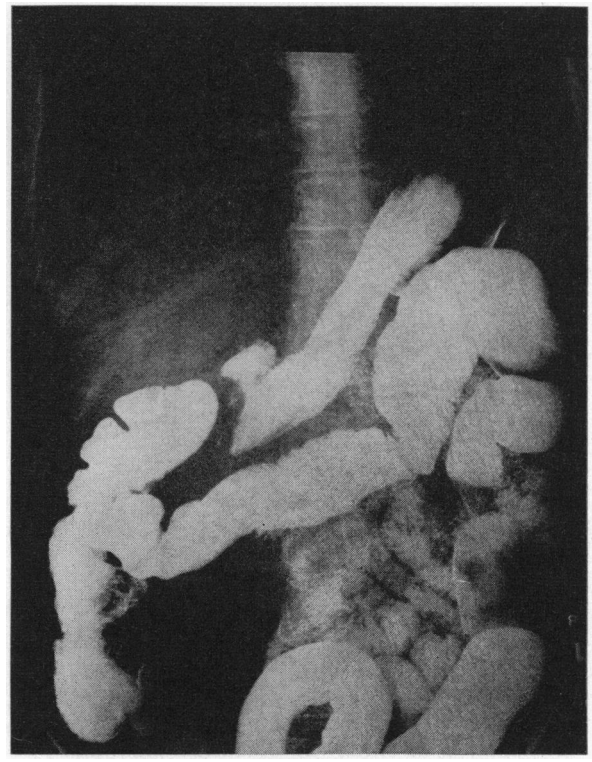

Figure 3.*—Postoperative film. The antrum is fixed to the transverse colon and volvulus cannot occur.

to be an inadequate measure for securing the stomach in position. It did appear feasible to suture the greater curvature to the transverse colon with seromuscular sutures to aid in fixation. However, with a large redundant colon this maneuver alone would undoubtedly prove inadequate. Hence, it was planned to unite the ascending colon to the hepatic portion of the transverse colon with seromuscular sutures and carry out a similar procedure on the splenic flexure so as to anchor the transverse colon between these two points.

Under spinal anesthesia a supraumbilical transverse incision was performed on August 3, 1955. No abnormality was noted on palpation of the small bowel, kidneys, spleen, liver, esophageal hiatus, pancreas and gallbladder. There was no palpable pathologic condition in the pelvis other than a few adhesions about the cecum from the previous appendectomy. The transverse colon was decidedly redundant, the mesocolon very lax. Nothing remarkable was noted about the gastrocolic ligament, although there was some elongation of the gastrohepatic ligament. The hepatic and splenic flexures were plicated by means of seromuscular sutures extended for approximately 8 cm. on each side as shown in Figure 2. It was noted at this point that the maneuver converted the redundant transverse colon into a fixed band (as between points *A* and *B* in Figure 2). The gastrocolic omentum was then divided from the large bowel and a similar plication was performed

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between the greater curvature of the stomach and the colon for a distance of approximately 12 cm. This appeared to fix the stomach firmly to the now nonyielding transverse colon. All three plications were done in a similar manner. Two interrupted No. 00 cotton sutures on either end reinforced a continuous row of No. 00 chromic catgut. All sutures were seromuscular. No gastroenterostomy was performed. At the completion of the operation, when the omentum was replaced in the peritoneal cavity it was noted that the stomach was firmly fixed in position. The patient tolerated the procedure very well. Gastric suction and parenteral alimentation were carried out for 48 hours. The patient was discharged from the hospital five days following the operation.

A month after the operation a gastrointestinal series and barium enema study were done (Figure 3). While the stomach showed normal mobility and pliability, there was not a vestige of the former hypermobility. Films taken in all positions, including deep Trendelenberg, demonstrated excellent fixation of the transverse colon and stomach.

Completely asymptomatic since the operation, she no longer feels any discomfort even when she assumes positions that formerly caused distress.

SUMMARY

1. A rare case of idiopathic gastric volvulus of the organo-axialis type is presented.
2. The literature on this subject is reviewed.
3. A new surgical method, used with excellent result, is presented for the treatment of this unusual condition.

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Calcified Meconium Abscess Causing Intestinal Obstruction in an Infant

Report of a Case and Review of the Subject

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THE PATIENT, a boy, was delivered by cesarean section on September 12, 1949, a full term, viable infant weighing 6 pounds 5 ounces.

The prenatal course was possibly of some significance in that in an automobile accident on June 21, 1949, the mother was thrown beneath the dashboard and struck her abdomen. The following day, although she complained of pain and tenderness in the midabdomen, there was no objective evidence of significant trauma, and the symptoms gradually subsided. On August 22, 1949, two months after the accident, roentgenograms were taken to determine the fetal age. In films an oval, calcified ring was noted in the vicinity of the fetal abdomen (Figure 1). In retrospect, this was the mass later discovered within the infant's abdomen at birth, but was interpreted at the time as calcification within a fibromyoma of the mother's uterus.

Upon examination of the infant at birth, a hard, oval mass was noted beneath the abdominal wall just cephalad to the umbilicus. It was approximately 3 by 5 cm. in diameter. Except for undescended testes, no other abnormality was observed.

Roentgenograms taken the day after birth (Figure 2) showed an oval calcified intraabdominal mass 3 by 5 cm. in diameter adjacent to the anterior abdominal wall in the vicinity of the umbilicus. Also visible were a few scattered small areas of calcification elsewhere within the abdomen. Similar calcifications have been reported by Neuhauser[8] as suggestive of meconium peritonitis.

The diagnostic considerations were calcification in a hematoma or abscess or a teratoma. As the infant was asymptomatic, operation was postponed until he was older.

The infant took feedings well and passed normal meconium and subsequently had light yellow stools. He gained weight progressively and remained asymptomatic until November 27, 1949. He was then ten weeks old and weighed 10 pounds, 8 ounces. On that day, he refused feedings and vomited. The abdomen became distended and the baby cried intermittently as though in pain. He was hospitalized with a diagnosis of obstruction of the small bowel. Roentgenograms taken on entry showed no change in the calcified mass. In the next few days the symptoms subsided spontaneously on conservative management.

A week later the patient reentered the hospital with similar symptoms. He was moderately dehydrated and the abdomen was distended and tympan-

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